The Use of Private and Public Land for the Development of Heat Networks

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Abstract

District heating is a form of decentralized energy that has the potential to play a key role in stabilizing climate change. To dispense this decentralized energy from the heat source to the end-users, a heat network is needed. To realise (the potential of) these networks, there are a wide variety of issues to consider and barriers to overcome.

Law plays an important role in framing understandings of both heat networks and the legal design with regard to these networks. The article focuses on the legal challenge of land use to develop heat networks. Since developers do not have property rights on all the plots of land they want to use to realize their heat project, they need to secure appropriate land rights in order to locate their network in third party land. These land rights can be included in various legal instruments. It needs to be precisely determined what kind of rights one can obtain and which of those rights would be the most suitable for a particular district heating project.

The findings of the analysis indicate that a "one size fits all"-model is not the most appropriate policy to address issues on the complex and evolving crossroads of energy law, property law and contract law. A customized legal design is necessary to synchronize the interests of all stakeholders involved.

I Introduction

In the context of the European climate targets, Flanders (Belgium) has to achieve 20 per cent of its total energy consumption from renewable energy by 2020.[1] One third of this renewable energy target is to be realized through "green heat" (*groene warmte*).[2] By 2030, the energy efficiency target is 32.5 per cent.[3] The sustainability of heat is one of the major challenges in the energy transition.[4,5] An essential contribution to this must come from the development of heat networks.

Heat networks, also referred to as district heating schemes, supply heat from a central source directly to homes and businesses for space heating and sanitary hot-water purposes. District heating competes with property-level heating technologies, such as electric heating and heat pumps. Using systems of collective heat supply, a higher total energy efficiency can often be achieved compared with individual heat production at the level of the building or the company itself. A collective system refers to a shared system where several consumers are connected to one grid, in contrast to each consumer having an individual boiler.

District heating networks as such are not a source of energy, but merely a means of transport for beneficial use of large-scale sustainable heat sources in the heat supply. Therefore, the rollout of heat networks is not an end in itself; the rollout of heat networks is only justified if they prove to be the most cost-efficient heating technology. Since the infrastructure and climate conditions vary within the European Union, an analysis at the Member States' level of the need to support district heating infrastructure is essential.[6]

District heating has proved to be very flexible regarding the use of different energy sources. To supply heat to the network, there is a versatility of energy inputs available: natural gas, waste, biomass, wood chips, wood pallets. Non-industrial[7] heat networks can be divided into building-based networks and district networks. Building-based heat networks transport heat within a building and district heat networks transport heat from a distant heat source.[8]

Even though not all district heating plants use

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[1] Directive 2012/27/EU of the European Parliament and the Council of 25 October 2012 on Energy Efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EG and 2006/32/EC, 14 November 2012, L. 315/1 (hereafter: Energy Efficiency Directive).

[2] Concept note Heat Plan 2020 by B. Tommelein, https://www.energiesparen.be/sites/default/files/atoms/files/warmteplan.pdf, 1196 (consulted 9 April 2019).

[3] Directive 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency, 21 December 2018, L. 328/210 (hereafter: Revised Energy Efficiency Directive).

[4] The energy transition is a pathway toward transformation of the global energy sector from fossil-based to zero-carbon: International Renewable Energy Agency (IRENA), https://www.irena.org/energytransition (consulted 9 April 2019).

[5] L. Di Lucia and K. Ericsson, "Low-carbon district heating in Sweden – Examining a successful energy transition", *Energy Research & Social Science*, 2014, Vol. 4, 10–20.

[6] European Parliament resolution of 13 September 2016 on an EU Strategy on Heating and Cooling (2016/2058(INI)), 13 June 2018, C. 204/44.

[7] As opposed to heat networks on industrial sites.

[8] R. Haffner and M. de Rijke, "The Heat is On: Developments in the Regulation of the Heat Market in the Netherlands", in M. M. Roggenkamp and C. Banet (eds.), *European Energy Law Report, XI* (Cambridge: Intersentia, 2017) (257) 260.

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environmentally friendly fuels, district heating has a wide range of additional benefits. Firstly, combining district heating with renewable energy sources can help meet rising urban and industrial energy needs, improve efficiency and reduce local pollutants. Using renewable energy sources, heat networks can contribute significantly to achieve the aforementioned climate targets. Renewable-based district heating prevents the spread of more polluting individual heating systems, which increase air pollution in residential areas and are much more difficult to control than widespread district heating systems.[9] Secondly, the in-house installation is small, simple to run and maintain. Thirdly, although district heating requires large investment costs, the operating and maintenance costs are small.[10]

Given these advantages, it is not surprising that the European Commission indicates district heating networks as one of the means to reach energy efficiency and thus the European energy objectives. District heating and cooling currently represents around 10 per cent of the heat demand across the European Union, with large discrepancies between Member States.[11] Unlike some northern[12] and eastern[13] European regions, Flanders has no real tradition in district heating. In 2016, heating and cooling networks represented less than 1 percent of the Flemish heating and cooling requirements.[14] One of the main reasons behind the absence of local heat distribution systems until now was the cheap and secure availability of natural gas. Until last year, building developers were legally required to provide infrastructure to connect all units in new residential districts to the natural gas grid. Offering infrastructure for heat distribution would have increased the costs for developers. Under present law,[15] they can choose between gas or heat.[16]

Currently, heat seems to be on the rise, but the development of heat networks has proven to be rather complicated. After all, district heating networks are a distinctive form of development. As Jasanoff and Kim state, "new energy futures will need to reconfigure the physical deep structures of civilizations-grids and pipelines, seashores and pastoral landscapes, and suburbs and cities, that were shaped by the energy choices of the past".[17] A challenge that should not be underestimated are the upfront capital investments. Before any revenue starts to flow, huge sums must be spent on exploration, construction, permits and leases. Therefore, the European Parliament underlines the importance of ensuring access to finance, both short- and long-term, for investments in projects of all sizes related to the modernization of the heating and cooling sector, including for district heating, the upgrading of relevant grid infrastructure, the modernization of heating systems, including a shift to renewable sources, and an acceleration in the rate of building renovation.[18] In order to support Member States' ambitious contributions to the Union target, a financial framework aiming to facilitate investments in renewable energy projects in those Member States should be established, including through the use of financial instruments[19,20]

[9] European Parliament resolution of 13 September 2016 on an EU Strategy on Heating and Cooling (2016/2058(INI)), 13 June 2018, C. 204/44.

[10] J. Vansteenbrugge and G. Van Eetvelde, "District Heating Networks in the Framework of Spatial Planning.", in *Annual Congres: from Control to Co-evolution, Proceedings*, Association of European Schools of Planning (AESOP); Association of Collegiate Schools of Planning (ACSP), 2014, 6.

[11] Consideration 75 Directive 2018/2001 of the European Parliament and the Council of 11 December 2018 on the promotion of the use of energy from renewable sources, 21 December 2018, L. 328/93 (hereafter: Revised Renewable Energy Directive).

[12] In Sweden, district heating is the predominant form of heat supply. More than 90 per cent of the municipalities are being supplied with heat by heat supply companies: J. Söderstjerna and T. Skärblom, "District Heating Regulation in Sweden", in M. M. Roggenkamp and C. Banet (eds.), *European Energy Law Report, XI* (Cambridge: Intersentia, 2017) (223) 224. In Denmark, district heating supplies more than 50 per cent of the total heating demand: A. Rønne, "Heat Supply in Denmark: Any Lessons to Be Learned?", in M.M. Roggenkamp and C. Banet (eds.), *European Energy Law Report, XI* (Cambridge: Intersentia, 2017) (239) 245.

[13] In 2015, more than 40 per cent of the Czech Republic's residential heat demand was met through district heating: https://www.euroheat.org/knowledge-hub/district-energy-czech-republic/ (consulted 9 April 2019). In 2017, about 70 per cent of the population in Belarus was served by district heating: https://www.euroheat.org/knowledge-hub/district-energy-belarus/ (consulted 9 April 2019).

[14] MvT, *Parl.St.* Vl.Parl. 2016–17, no. 1056/1, 5, http://docs.vlaamsparlement.be/pfile?id=1239277.

[15] Decree 10 March 2017 amending the Energy Decree of 8 May 2009, regarding the connectivity to a natural gas distribution network and confirmation of the continuity of the sanctioning of the energy performance regulations, *Belgian Official Gazette* 10 April 2017, www.staatsblad.be.

[16] K. Mortelmans, "Flanders moves towards district heating", 3rd April 2014, http://www.flanderstoday.eu/innovation/flanders-moves-toward-district-heating (consulted 9 April 2019).

[17] Sheila Jasanoff and Sang-Hyun Kim, "Socio-Technical Imaginaries and National Energy Policy", *Science as Culture*, 2013, (189) 189.

[18] European Parliament Resolution of 13 September 2016 on an EU Strategy on Heating and Cooling (2016/2058(INI)), 13 June 2018, C. 204/46.

[19] Consideration 12 Revised Renewable Energy Directive.

[20] For a more extensive overview on the support of the European Union: European Commission, *Overview of Support activities and projects of the European Union on energy efficiency and renewable energy in the heating & cooling sector, Horizon 2020, Framework Programme 7 and Intelligent Energy Europe programmes of the European Union*, 2016, https://ec.europa.eu/energy/sites/ener/files/documents/overview_of_eu_support_activities_to_h-c_-_final.pdf (consulted 9 April 2019).

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II. Issues

In order to realize the potential of heat networks, there are a wide variety of issues to consider and barriers to overcome. However, the obstacles and difficulties regarding district heating are currently not sufficiently known due to a lack of knowledge, experience and pilot projects. This article aims to be a (small) step towards bridging the "legal knowledge gap" and to formulate some recommendations to boost the development of heat networks. Since other countries seem to be struggling[21] to regulate the different aspects as well,[22] the impact of this article may exceed the regional (and national) level.

To construct heat networks, it is necessary to settle property and legal issues with the owners of the properties through which the network will pass or with the owners of adjacent properties that will be occupied on a temporary basis for the accommodation of materials, machinery etc. required for project construction. This article aims to examine the legal possibilities to secure access to public and private land in order to construct heat networks, accounting for project specification and stakeholder interests. The scope of this article is limited to the legal challenge of land use to develop heat networks. Notwithstanding the importance of other legal challenges (e.g. rules on pricing, monitoring procedures, sanctions, metering etc.), they are not under review for the purpose of this paper.

Since the knowledge about the specific factors contributing to heat network governance and project success or failure is limited, the article also brings in empirical evidence, namely semi-structured expert interviews[23] and qualitative document analysis, to help and fill that gap. Given the diversity and complexity of heat networks, it is inevitable that different heating projects give rise to different legal issues. Nevertheless, the frustrations and sighs amongst stakeholders are mostly based on some main fundamental bottlenecks: the complexity of heat projects and the lack of relevant expertise within the local government.

Realising a district heating network requires long term, secure rights to construct and access the assets. Whether or not a district heating project is successful, depends significantly on these rights. Therefore, it is of the utmost importance that the most suitable rights are obtained to use public property and private property parcels to set up the heat network infrastructure, considering the lifespan of the project and other decisive characteristics.

The resulting outline of this article is the following. First, the existing regulatory framework for district heating networks is described. After that, heat networks are approached from a technical perspective. Both the physical components of a heat network and the key roles that need to be assumed in heat projects are discussed. I then move on to some technical specific characteristics and limitations that affect the acquisition of land rights on other people's property to develop heat networks. This will lead to an extensive discussion on the legal possibilities to use private land and public property. Finally, overall conclusions are drawn.

III. Regulatory Framework[24]

Article 2 of Directive 2009/28[25] gives a definition of district heating (and cooling): "'district heating' or 'district cooling' means the distribution of thermal energy in the form of steam, hot water or chilled liquids, from a *central* source of production through a network to multiple buildings or sites, for the use of space or process heating or cooling". With effect from 1 July 2021, the Renewable Energy Directive is repealed by the aforementioned Revised Renewable Energy Directive. Article 2 of the Revised Renewable Energy Directive determines that steam, hot water or chilled liquids for district heating (and cooling) can also emanate from *decentralised* sources of production.

The concept of district heating is also included in the Energy Efficiency Directive. Article 14 of the Energy Efficiency Directive obligated Member States to carry out and notify to the Commission, by 31 December 2015, a comprehensive assessment of the potential for the application of high-efficiency cogeneration and efficient district heating and cooling. For the purpose of this assessment, Member States should

[21] Or have been struggling in the past.

[22] E.g. D. Poputoaia and S. Bouzarovski, "Regulating district heating in Romania: Legislative challenges and energy efficiency barriers", *Energy Policy*, Vol. 38, 2010, 3820–3829; P. Westin, "Re-regulating district heating in Sweden", *Energy Policy*, Vol. 30, 2002, 583–596; S. Akerboom *et al.*, "Ruimtelijke inpassing van lokale duurzame energievoorzieningen: een duurzame (energie)gebiedsontwikkeling", Amsterdam University, Center for Energy Issues, 2012, https://pure.uva.nl/ws/files/2465488/154566_Onderzoeksnotitie_ruimtelijke_inpassing_van_LDE_s.pdf (consulted 9 April 2019).

[23] Much of the information presented in this article is derived from the interviews, though they are not individually cited within the text.

[24] For a more extensive overview of the regulatory framework for heat networks in Flanders: T. Chellingsworth and D. Vanherck, "Ambitie en bescheidenheid in een netwerk van wachtleidingen. Het regulerend kader voor warmte- en koudenetten in het Vlaamse Gewest", in K. Deketelaere and B. Delvaux (eds.), *Jaarboek Energierecht 2016* (Antwerpen: Intersentia, 2017) 155–219.

[25] Directive 2009/28/EC of the European Parliament and the Council of 23rd April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, 5 June 2009, L. 140/16 (hereafter: Renewable Energy Directive).

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have carried out a cost-benefit analysis covering their territory based on climate conditions, economic feasibility and technical suitability. If projects with combined heat and power with high energy efficiency and district heating and/or cooling networks are cost-effective and technically feasible, Member States should have taken the appropriate measures to develop an efficient infrastructure for district heating and cooling, and/or the development of high-efficiency cogeneration and use energy for heating and cooling from waste heat and renewable energy sources. However, the Energy Efficiency Directive does not define what is meant by 'appropriate measures', so it must be assumed that this is left to the appreciation of the Member States.[26]

Belgium is a federal state, composed of communities (*Gemeenschappen*) and regions (*Gewesten*).[27] In Belgium, "energy" is a shared competence between the federal government and the regions.[28] The promotion of renewable energy is primarily a regional competence. According to Article 6, § 1, VII, first paragraph, d) of the Special Act of 8 August 1980 on the reform of the institutions,[29] networks for remote heat supply are explicitly designated as a regional competence. Therefore, in Belgium, the "appropriate measures" referred to in article 14 of the Energy Efficiency Directive must be issued at regional level.

In 2013, district heating has been promoted in a draft resolution of the Flemish Parliament.[30] In this document, the Flemish Parliament asks the Flemish Government to support the expansion of heat (and cooling) networks in Flanders and to involve interested stakeholders. In 2015, VITO[31] developed a heat map. This map indicates where heat networks already exist and where there are suitable areas for creating new heat networks.

In March 2017, the Heat Decree (*Warmtedecreet*[32]) introduced a regulatory framework for district heating and cooling by amending the Flemish Regional Energy Decree (*Energiedecreet*[33]). Article 1.1.3, 133°/2 of the Energy Decree defines a heat network as a set of interconnected pipes and associated tools necessary for district heating, excluding industrial heating networks. Heat distribution within buildings is also not within the scope of this regulatory framework. Point of reference to define heat networks is the concept of district heating. "District heating" is defined in article 1.1.3, 113/1/1° Energy Decree as the distribution of thermal energy in the form of steam or hot water from a central production plant via a network that is connected to multiple buildings or locations, for space or process heating. The Heat Decree entered into force with effect from 1 April 2019.[34]

IV. Technical Framework

In this section, I first give an overview of the physical components of a heat network (4.1.). In the second part of this section, I explain different roles that need to be fulfilled in the development and operation of heat networks (4.2.).

4.1. Physical components of a heat network

Heat networks can be of very different size and complexity. Yet there are some common basic elements. The *above-ground installations* of a heat network include the heat source (plant), also referred to as energy centre. The heat source heats up water or creates steam. In addition, there are also smaller above-ground components such as pump stations and small control cabinets that can be installed relatively easily. Moreover, there is usually also some kind of "back up-station" to be able to deal with a sudden difference in supply and demand (e.g. a sudden need for extra heat at peak (winter) periods).[35]

[26] T. Chellingsworth and D. Vanherck, "Ambitie en bescheidenheid in een netwerk van wachtleidingen. Het regulerend kader voor warmte- en koudenetten in het Vlaamse Gewest", in K. Deketelaere and B. Delvaux (eds.), *Jaarboek Energierecht 2016* (Antwerpen: Intersentia, 2017) 162, no. 26.

[27] Article 1 of the Belgian Constitution.

[28] B. Delvaux and W. Geldhof, "Openbare gasdistributie op een gesloten distributienet – het land van Magritte?" (note under GwH 9 juli 2013, no. 98/2013), *MER* 2014, 143–144.

[29] Special law of 8 August 1980 reforming the institutions, *Belgian Official Gazette* 15 August 1980, 9434.

[30] Draft resolution proposed by B. Martens, R. Bothuyne, L. Homans, M. Hostekint, T. Rombouts and V. Taeldeman and M. Hendrickx concerning the development of district heating network, http://docs.vlaamsparlement.be/pfile?id=1037756.

[31] Flemish Institute for Technological Research (*Vlaamse Instelling voor Technologisch Onderzoek*).

[32] Decree of 10 March 2017 amending the decree of 20 December 1996 regulating the role of the local advisory committee within the framework of the right to minimum supply of electricity, gas and water and of the Energy Decree of 8 May 2009, with regard to the introduction of a regulatory framework for heating or cooling, *Belgian Official Gazette* 13 April 2017, www.staatsblad.be (hereafter: Heat Decree).

[33] Decree of 8 May 2009 containing general provisions concerning the energy policy, *Belgian Official Gazette* 7 July 2009, www.staatsblad.be (hereafter: Energy Decree).

[34] Article 24 Order of the Flemish Government (*Besluit van de Vlaamse Regering*) of 1 February 2019 amending the order of the Flemish Government of 16 September 1997 concerning the composition and functioning of the local advisory committee on the minimum supply of electricity, gas and water and of the Energy Decree of 19 November 2010, regarding distribution and delivery of thermal energy, *Belgian Official Gazette* 1 April 2019, www.staatsblad.be.

[35] European Commission, "Background report on EU-27 District Heating and Cooling Potentials, Barriers, Best Practice and Measures of Promotion", *JRC Scientific and Policy Reports* 2012, 11, https://setis.ec.europa.eu/system/files/JRCDistrictheatingandcooling.pdf (consulted 9 April 2019).

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The actual heat network consists of an *underground network* of pipes and cables. Through this underground network of insulated double pipelines carrying hot water, the network brings heat from one or more heat sources (heat generation plants) to multiple heat consumers.[36] In most district heating projects, the underground infrastructure consists of the following three parts. The primary network transmits heat from the heat source to sites or buildings. The secondary network distributes heat within a building or collection of buildings. The tertiary network, at last, is the pipework within a residential property or commercial building .[37] Hydraulic separation between primary and secondary networks is provided by a *heat substation* which comprises a heat exchange.

The various physical assets have very different characteristics, lifespans and risk profiles. Consequently, there are various types of agreements for how the different assets of a heat network can be owned (and financed).[38]

4.2. Roles of multiple actors

If a heat network is to be successfully implemented, there are certain roles that need to be performed and different parties to fulfil these roles. Only the key roles that need to be assumed during the delivery of a heat network are discussed in this article.[39]

First of all, the heat network has to be constructed. The *installer* designs and installs the heat network. Once the heat network is fully operative, a *heat producer* generates thermal energy. The *heat supplier* sells this energy to the heat customers. These *customers* can be public buildings, residential properties, commercial premises, companies, etc. A *heat network operator* can be indicated to exploit and maintain the network.

Unlike the gas and electricity market, the development and operation of heat networks is not unbundled.[40] No roles are assigned to certain privileged market parties. This means that one party may take multiple roles and, likewise, a role could also be fulfilled by multiple parties. In very simple networks, such as for a single development site or housing estate, nearly all the roles may be fulfilled by a single party.[41] Usually, the heat activity is operated and organized by one vertically integrated company. Unbundling can potentially contribute to competition in a heat network and to security of supply. However, since the number of producers is often limited (most often not more than one), the advantages of unbundling are limited as well.[42] Most existing Flemish heating distribution projects have been based on a one-producer, one-customer model. In this model, investments are considerably risky: one actor pulling out can lead to an entire project no longer being profitable. Having a larger number of small, residential consumers could be a solution.[43]

V. Specifics of Heat Networks

Heat networks are not easy to realize. In addition to the aforementioned obstacles (large investment costs for the construction of the network, lack of relevant expertise and a large number of parties involved with sometimes divergent interests), the local character of heat networks entails some obstacles as well. In resolution 2016/2058,[44] the European Parliament points out this local character, since availability and infrastructure, as well as the demand for heat, depends essentially on local circumstances.

Although the gas and electricity market are closely linked to the market for the supply of heat, there are some important differences. One of the main differences concerns the infrastructure. While the gas and electricity network crosses almost the entire country, heat networks are usually a local phenomenon, forming a closed circuit.[45] Due to its poor transport-

[36] G. Davies and P. Woods, *The potential and costs of district heating networks, A report to the (UK) Department of Energy and Climate Change* (Pöyry Energy Consulting: Oxford, April 2009) 16 and 19, https://webarchive.nationalarchives.gov.uk/20121205193015/http://www.decc.gov.uk/assets/decc/what%20we%20do/uk%20energy%20supply/energy%20mix/distributed%20energy%20heat/1467-potential-costs-district-heating-network.pdf (consulted 9 April 2019).

[37] A. Gibbons *et al., Heat Network Detailed Project Development Resource: Guidance on Strategic and Commercial Case* (BEIS: 2016) 10–11.

[38] Scottish Futures Trust, *Guidance on the development of Heat Supply Agreements for District Heating schemes*, February 2018, http://www.districtheatingscotland.com/wp-content/uploads/2018/02/HSA-guidance-final-Feb-18.pdf, 6–7 (consulted 9 April 2019).

[39] For more roles that need to be performed and multiple parties taking these roles: A. Gibbons *et al., Heat Network Detailed Project Development Resource: Guidance on Strategic and Commercial Case* (BEIS, 2016) 11–17.

[40] L. de Deyne, "Legal Framework on District Heating Networks in Belgium and the Netherlands: Competition, Unbundling and Reasonable Prices?", *EEELR* 2016, 11–24.

[41] A. Gibbons *et al., Heat Network Detailed Project Development Resource: Guidance on Strategic and Commercial Case* (BEIS, 2016) 13.

[42] R. Haffner and M. de Rijke, "The Heat is On: Developments in the Regulation of the Heat Market in the Netherlands", in M. M. Roggenkamp and C. Banet (eds.), *European Energy Law Report, XI* (Cambridge: Intersentia, 2017) (257) 271–272.

[43] K. Mortelmans, "Flanders moves towards district heating", 3th April 2014, http://www.flanderstoday.eu/innovation/flanders-moves-toward-district-heating (consulted 9 April 2019).

[44] European Parliament Resolution of 13 September 2016 on an EU Strategy on Heating and Cooling (2016/2058(INI)), 13 June 2018, C. 204/42.

[45] L. de Deyne, "Legal Framework on District Heating Networks in Belgium and the Netherlands: Competition, Unbundling and Reasonable Prices?", *EEELR* 2016, (11) 14.

ability, heat cannot be transported from one regional network to another: per kilometre that needs to be bridged there is a (limited) return loss and an investment cost. Unlike gas and electricity, which are transportable over hundreds of kilometres, heat transport is limited. Therefore, in order to have a maximum return, it is important that the heat producer and customers are not too far apart. As with many forms of renewable energy, spatial factors such as proximity and density of heat demand, are important for the feasibility of the system.[46] Developing a heat network comes down to linking a sufficient heat demand to an available heat source.

The number of heat producers and customers cannot always be freely chosen. However, the number of producers and customers does influence the functioning of the market model. The density of buildings will affect the length and diameter of pipes necessary to connect them. In areas with few consumers, it can be too expensive to construct a heat network. Individual houses are far more expensive to connect than many apartments in a larger building.

The spatial suitability is another technical characteristic that can be an obstruction for the development of heat networks. The footprint of energy production (and transmission and distribution) will increase and space will be explicit in the energy system.[47] Heat networks also contribute to this evolution. Compared with, for example, wind turbines district heating networks are not highly visible infrastructural projects. Nevertheless, the installation of underground cables and pipes, which can be hundreds of meters or even kilometres long, is required. Designing pipe routes to ensure the most effective network will reduce costs.[48] Underground networks require space that is already partly occupied by other infrastructure: e.g. electricity, telecommunications, sewage, water. Synergy with other (utility) infrastructure can be cost-saving, but is not always feasible. The economic feasibility of heat networks also depends on a long-term commitment, both in terms of supply and demand. Especially when companies are involved in the network, such commitment cannot be taken for granted in times of economic crisis.[49]

Due to these technical limitations, there is no wholesale market for district heating. Consumers cannot choose between different district-heating providers.[50] Heat supply networks operate as separate "islands" and therefore do not create the possibility of free trade.[51]

VI. The Use of Private and Public Land for the Development of Heat Networks

Property rights and land administration are crucial for the successful development and implementation of district heating networks. A study of the Committee of the Regions of the European Union resulted in fifteen important local and regional influence factors, also including property rights and land administration.[52]

This section illustrates first of all the principle of "vertical accession" and the importance of a horizontal division of ownership (6.1.). Secondly, I explain the different legal possibilities to use someone else's private land to construct and operate heat networks (6.2). In the last part of this section, I discuss the possibilities to use public land to construct and operate heat networks (6.3).

6.1 Asset ownership versus land ownership

In line with concepts of ownership in other continental legal systems based on Roman law, buildings and other structures located on a property are parts of such property, and are consequently owned by the owner of the land (and may not be separately transferred).[53] Applying this principle of "vertical accession" (*superficies solo credit*), would lead to a division of ownership between all landowners whose parcel is involved in the heat network. Such an

[46] J. Vansteenbrugge and G. Van Eetvelde, "District Heating Networks in the Framework of Spatial Planning", in *Annual Congres: from Control to Co-evolution, Proceedings*. Association of European Schools of Planning (AESOP); Association of Collegiate Schools of Planning (ACSP), 2014, 6.

[47] J. Vansteenbrugge and G. Van Eetvelde, "District Heating Networks in the Framework of Spatial Planning", in *Annual Congres?: from Control to Co-evolution, Proceedings*. Association of European Schools of Planning (AESOP); Association of Collegiate Schools of Planning (ACSP), 2014, 2.

[48] L. Riahi, *District Energy in Cities: Unlocking the Potential of Energy Efficiency and Renewable Energy*, (Paris: UNEP, 2017) 41.

[49] B. Vanheusden and L. de Deyne, "Warmtenetten: juridische (on)zekerheid? Analyse van zaken-, energie- en contractenrechtelijke aspecten bij de aanleg en exploitatie van een warmtenet", *MER* 2015, afl. 2, (99) 101, no. 3.

[50] M. Wissner, "Regulation of district-heating systems", *Utilities Policy* 31, 2014, (63) 63.

[51] A. Rønne, "Heat Supply in Denmark: Any Lessons to Be Learned?", in M. M. Roggenkamp and C. Banet (eds.), *European Energy Law Report, XI* (Cambridge: Intersentia, 2017) (239) 253.

[52] C. Lucha, A. Prahl, B. Kampman, S. Cherif, C. Rothballer and A. Storch, *Local and Regional State of Play and Policy Recommendations Concerning Sustainable Heating and Cooling: Focusing on EU Level Policy* (European Union: 2016) https://cor.europa.eu/en/engage/studies/Documents/Sustainable%20Heating%20and%20Cooling.pdf, 52–53 (consulted 9 April 2019).

[53] Article 552 of the Belgian Civil Code; B. Akkermans and W. Swadling, "Types of Property Rights – Immovables and Movables (Goods)", in S. Van Erp and B. Akkermans (eds.), *Cases, Materials and Text on Property Law, Ius Commune Casebooks for the Common Law of Europe* (Oxford-Portland: Hart Publishing, 2012) (211) 280–282.

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"ownership split" is (legally) not desirable. However, the principle of "vertical accession" has no binding character and can therefore be set aside (horizontal division of the real property right) so that a distinction is made between asset ownership and land ownership.[54]

Consequently, developers of heat networks will have to enter into contractual agreements with different landowners. The role of the landowner is to grant rights to build energy centres or substations and for the routing of buried pipes. The landowner also has to provide rights of access for the installation, operation and maintenance of (the) plant(s) and equipment.[55]

A distinction has to be made between different groups of physical assets of a heat network: generation assets (production), transmission network (primary assets), distribution network (secondary assets). The ownership could be split for the different classes of assets. After all, the transmission and distribution network consist of pipes that have to be installed departing from the heat producer (e.g. heat plant), to the (connection of) the building (customers).[56]

Landowners have various options to grant land rights on their property for the construction of a heat network. These possibilities are explained further below. For the terrain on which the generation assets are located, a separate agreement is recommended, because, usually, specific arrangements have to be made.

Once (long term) rights are let for the laying of pipework infrastructure or the installation of heat generation assets, other uses of the land for other forms of development or other forms of energy generation in the future may be limited.[57] Therefore, landowners can try to negotiate rent payments or another form of compensation for the use of land for heat network assets which reflect the alternative use value of the land. However, these fees may be reduced or waived if the landowner will benefit from the project.[58] When granting rights to install and operate heat network assets, the landowner can also impose conditions in relation to maintenance, insurance, repair, alteration, etc.[59]

6.2 The use of private property

To construct and operate the energy centres and the infrastructure (pipelines, etc.) for heat networks on private land, the developer has to enter into a private law agreement with the landowner.[60] This agreement is just one element of a complex contractual matrix that underpins the development and operation of heat networks.[61]

The easiest way to cross third party land in order to lay cables and pipes, is a mere tolerance of the landowner. However, such tolerance offers few guarantees regarding for example the duration of the land right and the ownership of the constructions.[62] The principle of "vertical accession" applies to a mere tolerance. Therefore, it is important to obtain property rights for the development of a heat network. A property right is attached to the property and thus remains attached to it, regardless where (in whose hands) the property is located. Since the lifespan of well-maintained district heating networks (pipelines) can be fifty years or more, it is not inconceivable that property will be sold or inherited during that period. To make rights opposable against third parties, a notarial deed is required which is transferred to the land register.[63]

6.2.1 Right of ownership

First of all, a developer can purchase the land on or in which the pipeline is to be installed. The right of ownership is the most extensive right of all property rights.[64] It is possible for the developer to only purchase (part of) the surface that he needs for the

[54] P. Lecocq, "Manuel de droit des biens, t. 1" in *Collection de la Faculté de droit de l'Université de Liège* (Brussel: Larcier, 2012) 277, no. 110.

[55] A. Gibbons *et al., Heat Network Detailed Project Development Resource: Guidance on Strategic and Commercial Case* (London: BEIS, 2016) 57.

[56] X. Yang, H. Li and S. Svendsen, "Energy, economy and exergy evaluations of the solutions for supplying domestic hot water from low-temperature district heating in Denmark", *Energy Conversion and Managemen*t 122, 2016, (142) 143.

[57] A. Gibbons *et al., Heat Network Detailed Project Development Resource: Guidance on Strategic and Commercial Case* (London: BEIS, 2016) 58.

[58] L. Riahi, *District Energy in Cities: Unlocking the Potential of Energy Efficiency and Renewable Energy*, (Paris: UNEP, 2017) 41.

[59] A. Gibbons *et al., Heat Network Detailed Project Development Resource: Guidance on Strategic and Commercial Case* (London: BEIS, 2016) 57.

[60] Analogue for the gas pipeline system: M. M. Roggenkamp *et al., Energy Law in Europe: national, EU, and International Regulation* (Oxford: Oxford University Press, 2007) 744–745, no. 10.127.

[61] Scottish Futures Trust, *Guidance on the development of Heat Supply Agreements for District Heating schemes*, February 2018, http://www.districtheatingscotland.com/wp-content/uploads/2018/02/HSA-guidance-final-Feb-18.pdf, 13 (consulted 9 April 2019).

[62] B. Vanheusden and L. de Deyne, "Warmtenetten: juridische (on)zekerheid? Analyse van zaken-, energie- en contractenrechtelijke aspecten bij de aanleg en exploitatie van een warmtenet", *MER* 2015, afl. 2, (99) 102, no. 6.

[63] Article 1 Mortgage Act 16 December 1851, *Belgian Official Gazette* 22 December 1851 (hereafter: Belgian Mortgage Act).

[64] B. Akkermans and W. Swadling, "Types of Property Rights – Immovables and Movables (Goods)", in S. Van Erp and B. Akkermans (eds.), *Cases, Materials and Text on Property Law, Ius Commune Casebooks for the Common Law of Europe* (Oxford-Portland: Hart Publishing, 2012) (211) 213.

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construction of the pipelines. The landowner retains ownership on the remaining part of the land.[65]

When a (local) government is involved in the construction of a district heating project, this government may also obtain a property through expropriation. It is possible to implement a vertically limited expropriation,[66] which means that only (a part of) the underground or space above the ground surface is expropriated. In the event that an expropriation of property is essential for (further) development of the heat supply system, an authority for such action is provided for in the Heat Decree in favour of the heat network operator.[67]

6.2.2 Limited property rights

If a developer does not own the land he wants to use to construct his heat network, he must obtain land rights to build the infrastructure. The term "land rights" is used as a collective term to cover the acquisition of property rights, such as the right of superficies and real servitudes, that developers will require to realize their network. A variety of "limited property rights" can be used within the sector of collective heating.

6.2.2.1 The right of superficies (*opstalrecht*)

The right of superficies (also referred to as building lease or building agreement) is the right to own buildings, works or plantings on, above or under someone else's property.[68] The right of superficies creates a temporary ownership split: for the duration of the right, the developer becomes the owner of the infrastructure (e.g. pipework) they have built, while the landowner retains their rights on the ground. The Belgian Superficies Act does not prescribe any compensation in favor of the landowner. The right of superficies is statutory limited to a maximum term of fifty years.[69] After that, the developer depends on the goodwill of the landowner to extend the right of superficies. It should be noted that the draft law on the reform of property law increases the statutory maximum term of the right of superficies from fifty to 99 years.[70] Moreover, the draft law provides that a right of superficies can be perpetual when this right is established by the owner "for purposes of public property".

The holder of this limited property right acquires the right to build on, above or under a property belonging to someone else. Therefore, the right of superficies is very relevant for the construction of a heat network, both for the above-ground installations and for the pipework. It is possible to limit the right of superficies for certain parcels to the subsurface. As far as the site of the heat producer is concerned, the agreement must also mention the heat exchanger(s) and the back-up combustion system if necessary. For these installations, the developer will need an above-ground right of superficies.

The advantage of a right of superficies is that, as a property right, it is susceptible to mortgage settlement by banks,[71] as a result of which the latter will sooner be prepared to finance the district heating project.

6.2.2.2 Real servitudes (*erfdienstbaarheden*)

The presence of infrastructure for a heat network necessarily involves certain limitations to the landowner's property rights. However, generally considered, the landowner is not completely deprived of the use of his land.[72] After all, the pipelines are situated below the ground surface. Therefore, real servitudes may be a suitable legal instrument for developing heat networks.

According to Belgian law, a real servitude is a property right developed on a particular property (the servient land) for the benefit of another property (the dominant land).[73] The main advantage of this limited property right is that real servitudes offer in principle an everlasting land right to the person who acquires it. In principle, real servitudes are free of charge, since the law does not prescribe any compensation.

Real servitudes can be compulsorily imposed through legislation (legal servitude) or can be negotiated between parties (servitude by grant). The purpose of servitudes created by law is a public or local interest, or a private interest.[74] A legal servitude implies that a landowner must tolerate a third party using his land, in principle without being compensated (unless the law explicitly stipulates compensation or a judge decides to grant compensation).[75] In contrast to servitudes by grant, a legal servitude requires no dominant land.[76]

[65] T. Vermeir, "Verticale eigendomsbegrenzingen door nutsvoorzieningen" in J. Ghysels, V. Sagaert and R. Palmans (eds.), *Onteigeningen en eigendomsbeperkingen onder de grond en in de lucht* (Antwerpen: Intersentia, 2008) 145.

[66] For a more extensive overview of the vertically limited expropriation: V. Sagaert, "Verticale eigendomsgrenzen en verticaal beperkte onteigeningen", in J. Ghysels, V. Sagaert and R. Palmans (eds.), *Onteigeningen en eigendomsbeperkingen onder de grond en in de lucht* (Antwerpen: Intersentia, 2008) 1–32.

[67] Article 4/1.1.10. § 1 Energy Decree.

[68] Article 1 Law of 10 January 1824 on the right of superficies, *Journal officiel du royaume des Pays-Bas* 1824, no. 13 (hereafter: Belgian Superficies Act).

[69] Article 4 Belgian Superficies Act.

[70] Article 3.195 Draft Law incorporating Book 3 "Goods" in the new Belgian Civil Code, Belgian Chamber of Representatives (2018–19) 54–3348/001, http://www.dekamer.be/FLWB/PDF/54/3348/54K3348001.pdf.

[71] Article 45 Belgian Mortgage Act.

[72] M. M. Roggenkamp *et al., Energy Law in Europe: national, EU, and International Regulation* (Oxford: Oxford University Press, 2007) 744–745, no. 10.127.

[73] Article 637 Belgian Civil Code.

[74] Article 649 Belgian Civil Code.

[75] A. Mast *et al., Overzicht van het Belgisch Administratief recht* (Mechelen: Wolters Kluwer, 2014) 407, no. 399.

[76] B. Akkermans and W. Swadling, "Types of Property Rights – Immovables and Movables (Goods)", in S. Van Erp and B. Akkermans (eds.), *Cases, Materials and Text on*

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Real servitudes are a very suitable possibility to use private land for the development of the (buried) pipework for heat networks. One of the main characteristics of real servitudes, is that they are *non-exclusive* property rights, since the owner of the servient property can continue to use his property (in this case the land underneath the servient land).[77] At first glance, this means that a landowner can still use his property (the servient land), as far as this does not impede the district heating system. However, for the construction of a heat network, the servient land (or at least the surface where the pipework is located) seems to be used in an *exclusive* way. Therefore, the question may arise whether real servitudes are indeed the appropriate legal instrument for constructing the pipework for heat networks.

The Energy Decree, as amended by the Heat Decree, grants heat network operators certain legal servitudes, e.g. the right to cut off branches in some cases.[78] More far-reaching is the possibility for the Flemish Government to grant a heat network operator the right (legal servitude) to lay pipework above or under private undeveloped land if this is in the public interest.[79] In my opinion, it is a missed opportunity that the legislator explicitly limits this legal servitude to pipework (*leidingen*).

Legal servitudes do not prevent parties from (also) negotiating servitudes by grant. A right of way (servitude of passage) is the most suitable servitude by grant for the construction of (underground) cables and pipelines. The servitude of passage is the right to cross someone else's property (servient land) within the limits of the development title.[80] It must be noted that using a real servitude by grant (right of way) for the construction of pipework is not totally undisputed in the Belgian legal doctrine, since there is no dominant land to be distinguished.[81]

Furthermore, restrictions in relation to adjoining property must also be considered. To ensure that activities on neighbouring land do not affect the district heating scheme, relevant restrictions should be imposed on (the) neighbouring (pieces of) land (e.g. excavation works or tree planting). These restrictions are usually imposed within a certain radius (for example five meters), on both sides of the axis of the pipes. The most suitable legal instrument to impose such restrictions is a servitude *non aedificandi*: a limited property right that includes the prohibition to build.[82]

To avoid the principle of "vertical accession" as explained above, the right of superficies plays an important role as an accessory to real servitudes. As (limited) property rights, also including the ability to build, real servitudes imply that the beneficiary has an accessory superficies right on the constructions they have set up.[83] This implies a division of ownership (asset ownership versus land ownership) which is not legally limited to fifty years. The division of ownership resulting from the accessory right of superficies applies for the duration of the main right (in this case the real servitude).[84]

6.2.2.3 The right of emphyteusis (*erfpachtrecht*)

The right of emphyteusis[85] is a temporary property right which allows full enjoyment of a property belonging to another.[86] In exchange for the grant of a right of emphyteusis an agreement for payment, known as canon, can be made. The duration of a right of emphyteusis is statutory limited to a maximum term of 99 years and has a minimum duration of 27 years.[87] After a maximum term of 99 years, the developer depends on the goodwill of the landowner to extend the right of emphyteusis. It should be noted that the draft law on the reform of property law decreases the statutory minimum term of the right of emphyteusis from 27 to fifteen years.[88] Moreover, the draft law provides that a right of emphyteusis can be perpetual when this right is established by the owner "for purposes of public property".

A right of emphyteusis thus offers a very extensive usage right to the holder of that right. To avoid the

cont.

Property Law, Ius Commune Casebooks for the Common Law of Europe (Oxford-Portland: Hart Publishing, 2012) (211) 252; A. De Pover, *Erfdienstbaarheden van openbaar nut* (Brugge: die Keure, 1972) 8.

[77] V. Sagaert, *Goederenrecht* (Mechelen: Kluwer, 2014) 452–453, no. 557.

[78] Article 4/1.1.7. § 1, 1¤pi1¤ > 8 Energy Decree.

[79] Article 4/1.1.7. § 3 Energy Decree.

[80] V. Sagaert, "Actuele ontwikkelingen inzake erfdienstbaarheden", in: H. Vandenberghe (ed.), *Themis Zakenrecht* (Brugge: die Keure) 2005–06, (57) 60, no. 8.

[81] V. Sagaert, "Het zakenrechtelijk statuut van nutsleidingen in het Belgische recht", *TPR* 2004, (1351) 1390, no. 39.

[82] L. Lindemans, *Erfdienstbaarheden* (Brussel: Larcier, 1958) 141, no. 341.

[83] V. Sagaert, "Ondergrondse constructies in het Belgische goederenrecht" in C. Adriaansens and V. Sagaert (eds.), *Ondergrondse constructies in het Belgische en Nederlandse recht* (Antwerpen: Intersentia, 2007) 15, no. 26.

[84] M. E. Storme, *Erfpacht en opstalrecht*, March 2018, 51–52, https://www.law.kuleuven.be/personal/mstorme/ZCR-erfpachtopstal.pdf (consulted 9 April 2019).

[85] Sometimes also known as the right of long-lease: B. Akkermans, V. Sagaert and W. Swadling, "Types of Property Rights – Immovables and Movables (Goods)", in S. Van Erp and B. Akkermans (eds.), *Cases, Materials and Text on Property Law, Ius Commune Casebooks for the Common Law of Europe* (Oxford-Portland: Hart Publishing, 2012) (211) 273.

[86] Article 1 Law of 10 January 1824 on the right of emphyteusis, *Journal officiel du royaume des Pays-Bas* 1824, no. 50 (hereafter: Belgian Emphyteusis Act).

[87] Article 2 Belgian Emphyteusis Act.

[88] Article 3.184 Draft Law incorporating Book 3 "Goods" in the new Belgian Civil Code, Belgian Chamber of Representatives (2018–19) 54–3348/001, http://www.dekamer.be/FLWB/PDF/54/3348/54K3348001.pdf.

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"vertical accession", an accessory superficies right is attached to the right of emphyteusis. It is possible to limit a right of emphyteusis for certain parcels to the subsurface. Consequently, for the duration of the right of emphyteusis, the ownership of the land is split off from the ownership of the constructed pipework for the heat network.

At first glance, a right of emphyteusis seems very interesting for developing a heat network. However, it will not be easy to convince landowners to grant such a far-reaching property right, since a right of emphyteusis reduces the property rights of the landowner to a large extend. Not only is the holder granted the right to set up constructions; in fact, they become a general right to use the parcel(s).[89]

6.3 The private use of public property

As a manager of public property, the local government has an important facilitating role in the construction of heating networks. Article 15 of the Revised Renewable Energy Directive indicates that the European Union is aware of this facilitating role: "Member States shall ensure that their competent authorities at national, regional and local level include provisions for the integration and deployment of renewable energy, including for renewables self-consumption and renewable energy communities, and the use of unavoidable waste heat and cold when planning, including early spatial planning, designing, building and renovating urban infrastructure, industrial, commercial or residential areas and energy infrastructure, including electricity, district heating and cooling, natural gas and alternative fuel networks. Member States shall, in particular, encourage local and regional administrative bodies to include heating and cooling from renewable sources in the planning of city infrastructure where appropriate, and to consult the network operators to reflect the impact of energy efficiency and demand response programs as well as specific provisions on renewables self-consumption and renewable energy communities, on the infrastructure development plans of the operators".[90]

Since local authorities play a crucial role as directors of a local heat strategy, some level of public sector involvement is nearly always needed. Local governments are uniquely positioned to advance district energy systems. There are various ways in which local and regional authorities can get involved.[91] The local authority can participate in the project as proponent and facilitator, e.g. through supportive spatial and energy planning, allotting city assets for district energy installations or connections or through the implementation of information and public awareness campaigns to help creating acceptance and a market.[92] Furthermore, public facilities can provide the anchor loads for district energy, e.g. through guaranteeing demand from government buildings, hospitals, etc..[93]

Municipal support is also needed to enable access to roads and public land to build networks (and heat sources). For electricity pipelines, there is legislation[94] that grants the right to have carried out under and above public property (roads, squares, watercourses, etc.) all works necessary for the construction and maintenance of these pipelines. This right is a legal servitude. Given the abovementioned specific character of the heat networks market, this legislation does not apply (by analogy) to the pipelines of heat networks.

According to the Belgian Supreme Court, public land is land that has been dedicated either explicitly or implicitly by public authorities to the use of all, without distinction.[95] Because of this specific purpose, public land is inalienable.[96] This means that, in principle, it is not possible for a local authority (e.g. a municipality) to grant personal rights or property rights on public land. According to this traditional view, public property can only be given in private use through permits and (domain) concessions.[97] More

[89] B. Vanheusden and L. de Deyne, "Warmtenetten: juridische (on)zekerheid? Analyse van zaken-, energie- en contractenrechtelijke aspecten bij de aanleg en exploitatie van een warmtenet", *MER* 2015, afl. 2, (99) 106, no. 13.

[90] Article 15, 3 Revised Renewable Energy Directive.

[91] L. Riahi, *District Energy in Cities: Unlocking the Potential of Energy Efficiency and Renewable Energy*, (Paris: UNEP, 2017) 47–83.

[92] C. Lucha, A. Prahl, B. Kampman, S. Cherif, C. Rothballer and A. Storch, *Local and Regional State of Play and Policy Recommendations Concerning Sustainable Heating and Cooling: Focusing on EU Level Policy* (European Union: 2016) https://cor.europa.eu/en/engage/studies/Documents/Sustainable%20Heating%20and%20Cooling.pdf, 41, 47.

[93] C. Lucha, A. Prahl, B. Kampman, S. Cherif, C. Rothballer and A. Storch, *Local and Regional State of Play and Policy Recommendations Concerning Sustainable Heating and Cooling: Focusing on EU Level Policy* (European Union: 2016) https://cor.europa.eu/en/engage/studies/Documents/Sustainable%20Heating%20and%20Cooling.pdf, 42.

[94] Article 9 Law of 12 April 1965 on the transport of gaseous products and others by pipeline, *Belgian Official Gazette* 7 May 1965; Article 13 Law of 10 March 1925 on the electricity supply, *Belgian Official Gazette* 25 April 1925; Article 4.1.27. § 1 Section 1, Energy Decree.

[95] Belgian Supreme Court 17 October 2014, *RW* 2015–16, 1065, note N. Vandamme; Belgian Supreme Court 3 May 1968, *RCJB* 1969, 5.

[96] Belgian Supreme Court 17 March 1924, *Pas.* 1924, I, 256; J. De Staercke, *Domeingoederenrecht* (Antwerpen: Intersentia, 2006) 81; H. De Page and R. Dekkers, *Traité élémentaire de droit civil belge*, V (Brussel: Bruylant, 1975) 713–716, no. 808–810.

[97] V. Sagaert, *Goederenrecht* (Mechelen: Kluwer, 2014) 129, no. 153.

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recently,[98] both legislation[99] and case law[100] seem to allow property rights (real servitudes, right of superficies, etc.) on public property, provided that this is compatible with the public destination of these goods. Moreover, in legal doctrine one can read that a government, under certain conditions, has the authority to make use of private law contract techniques.[101]

Any right granted by a (local) authority on public property is precarious and revocable. This means that, at all times, the authority can put an end to a certain use of public property, either because private use has become incompatible with the destination or for reasons of public interest, even when the right was granted for a definite period of time.[102]

6.3.1 Administrative land rights

When a heat network operator wants to use public land for laying his pipework, he can ask the domain administrator for a (unilateral) *domain admission* (*domeintoelating*).[103]

Another possibility to use public land for the construction and operation of heat networks is the *domain concession* (*domeinconcessie*). A domain concession is a contract that can be negotiated between municipalities and operators of heat networks. A domain concession is an agreement on the basis of which a public authority, temporarily and in a way that excludes the rights of others, authorizes a person to use public property for a particular purpose.[104] In general, it is assumed that domain concession agreements cannot exceed a period of 99 years.[105] The public authority can unilaterally revoke a domain concession for reasons of public interest. Nonetheless, the authority-concession provider has to award the concessionary full compensation.[106]

The beneficiary of a domain admission or a domain concession can be granted the right to build on public land. If the beneficiary exercises this right, he acquires an accessory superficies right on these goods for the duration of the domain concession or domain authorization.[107] In this way, "vertical accession" is avoided.[108] Consequently, for the duration of the administrative land rights, the developer legally owns the physical assets they have constructed.[109] The right to build may be explicitly or implicitly included in the domain concession agreement or in the domain admission.

As administrative land rights, the domain concession and the domain admission are in principle *intuitu personae*, which means that the beneficiary of these rights cannot transfer them to a third party without permission from the (local) authority.[110] However, the transferability of the administrative land rights can be explicitly agreed or prescribed. Both the *intuitu personae*-character and the precarity have a negative impact on the financing options ("bankability") for the beneficiary of these administrative land rights. The precarity also extends to the mortgage, which affects its economic security.[111]

6.3.2 Property rights on public land

As mentioned before, it was traditionally not possible to grant property rights on public land. However, last decade's case law[112] generally accepts that certain property rights can be granted on public property. These property rights may not interfere with the

[98] Regarding real servitudes for the first time in 1957: Belgian Supreme Court 6 December 1957, *Arr.Cass.* 1958, 210.

[99] E.g. Article 10 Decree 18 July 2003 on public-private cooperation, *Belgian Official Gazette* 19 September 2003, www.staatsblad.be; Article 191 Flemish Municipal Decree 15 July 2005, *Belgian Official Gazette* 31 August 2005, www.staatsblad.be; Article 185 Flemish Provincial Decree 9 December 2005, *Belgian Official Gazette* 29 December 2005, www.staatsblad.be.

[100] E.g. Belgian Supreme Court 18 May 2007, *RW* 2007–08, 736, note V. Sagaert; Belgian Supreme Court 27 September 1990, *Arr.Cass.* 1990–91, (84) 86–87; Belgian Supreme Court 11 September 1964, *RW* 1965–66, 494.

[101] E. Van Hooydonk, *Beginselen van Havenbestuursrecht* (Brugge : die Keure, 1996) 274, no. 118; D. Renders and B. Gors, "La précarité des titres d'occupation privative du domaine public", in: X. (ed.), *Le domaine publique économique, Jurim Pratique*, 2015, 147–174.

[102] S. Van Garsse, *De concessie in het raam van de publiek-private samenwerking* (Brugge: die Keure, 2007) 193, no. 369; N. Van Damme, "Erfdienstbaarheden op het openbaar domein in het licht van de zesde staatshervorming: dan toch naar een administratief zakelijk recht?", *Jura Falc.* 2013–14, no. 2, 514–515.

[103] Article 4/1.1.13. § 1 Energy Decree.

[104] Belgian State Council 21 June 1994 no. 48.082, n.v. Seaport Terminals/stad Antwerpen http://www.raadvanstate.be/Arresten/48000/000/48082.pdf.

[105] S. Van Garsse, *De concessie in het raam van de publiek-private samenwerking* (Brugge: die Keure, 2007) 274, no. 515; E. Van Hooydonk, *Beginselen van Havenbestuursrecht* (Brugge: die Keure, 1996) 287, no. 124.

[106] P. Flamey and A. Lippens, "De eenzijdige wijziging van domeinconcessievoorwaarden" (note under Court of Appeal Antwerp 28 April 2014 and Court of Appeal Antwerp 4 September 2014), *T.Aann.* 2016, (356) 361, no. 4 and 376 no. 16.

[107] V. Sagaert, B. Tilleman and A.-L. Verbeke, *Vermogensrecht in kort bestek* (Antwerpen: Intersentia, 2010) 37, no. 73.

[108] Court of First Instance Bruges 20 December 1993, *Act.dr.* 1996, 807, note A. Dumoulin.

[109] V. Sagaert, *Goederenrecht* (Mechelen: Kluwer, 2014) 139–140, no. 160.

[110] V. Sagaert, *Goederenrecht* (Mechelen: Kluwer, 2014) 137, no. 159; P. Orianne, *La loi et le contrat dans les concessions de service public* (Brussel: Larcier, 1961) 50, no. 42. *Contra*: S. Van Garsse, *De concessie in het raam van de publiek-private samenwerking* (Brugge: die Keure, 2007) 281–282, no. 525–527.

[111] V. Sagaert, *Goederenrecht* (Mechelen: Kluwer, 2014) 140, no. 160–161.

[112] E.g. for the right of superficies: Belgian Supreme Court 18 May 2007, *RW* 2007–08, 736, note V. Sagaert.

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aforementioned destination of the goods as "public property".

Whenever a property right is to be granted on public land, it must be ascertained ("*in concreto*-assessment") whether this property right is compatible with the destination as "public property" and with the use of this public property by everyone.[113] As mentioned before, every property right on public property is precarious as it is revocable by the public authority for reasons of public interest.[114] If the government proceeds to grant a property right, the general principles of good governance (transparency, equality, non-discrimination) must be respected.[115]

Regarding public property owned by municipalities, the possibility to grant property rights is explicitly provided for in article 191 of the Flemish Municipal Decree.

6.4 Comparative research

Not only in Flanders (Belgium), but for example also in Germany, the regulatory framework for district heating is mainly based on private-law contracts.[116] §§1090–1093 of the German Civil Code (Bürgerliches Gesetzbuch) introduces the "limited personal servitude" (*beschränkte persönliche Dienstbarkeit*), a property right that is in principle not transferable but the exercise can be "left" to a third party if this is stipulated in the settlement agreement (§1092, lid 1 Bürgerliches Gesetzbuch). The "*beschränkte persönliche Dienstbarkeit*" could be described as a right between the usufruct and the real servitude.[117] The "*beschränkte persönliche Dienstbarkeit*" does not grant a comprehensive right to enjoy a property, but only grants one or several specific competences concerning that property.[118] §1092 III Bürgerliches Gesetzbuch determines that "*beschränkte persönliche Dienstbarkeiten*" are transferable when they serve for utilities (electricity, heat networks, telecommunications, etc.) or for traffic (roads and railways). In this way, the reorganization and, where appropriate, the privatization of utilities is facilitated.[119] Since the "*beschränkte persönliche Dienstbarkeit*" does not require a dominant land,[120] this land right could be very useful for the development of district heating networks.

In the United Kingdom, an alternative for granting a real servitude for pipework, is a Wayleave. A Wayleave is a contract between the owner or occupier of land (the grantor) and a third party (the grantee) permitting the grantee to access privately-owned land to carry out works in return for some form of compensation.[121] A Wayleave is a permit, rather than a registrable interest in land. As it does not bind future owners of property, a Wayleave may not be considered to be a secure enough right (particularly as a heat network operator will not have the same statutory rights as a statutory entrepreneur which can require Wayleaves to be granted for the laying of pipework for utilities).[122]

VII Conclusions

The shift to heat distribution projects does not take place in an isolated world. It is embedded in complex legal arrangements which need to be adjusted in light of infrastructural change. Network design and build should be improved to better align the interests of all parties involved.

The most effective approach to address the concerns relating to land use for the development of heat networks is to elaborate a script to set up heat network projects. Regulation can be used to advance district heating in several ways, for example to obtain property or real servitudes for distribution pipes.[123] Developing a regulatory body is recommended, not only to protect customers from poorly designed, built and operated heat projects, but also to boost the development of such projects. Thoughtful spatial planning and a detailed register of all underground pipework and facilities could be cost- and time-saving for the development of district heating projects. Heat planning can help to prioritize and streamline the (future) development of the district heating sector.

Due to the many parties involved and the local character of the networks, regulating district heating networks is complex. A flexible regulatory regime is

[113] V. Sagaert, *Goederenrecht* (Mechelen: Kluwer, 2014) 135, no. 156.

[114] S. Van Garsse and M. Lernout, "Erfpacht en opstal & de overheid" in N. Carette (ed.), *Erfpacht en opstal* (Antwerpen: Intersentia, 2018) 233–234, no. 26–27.

[115] E.g. Belgian State Council 18 January 2000 no. 84.721, *DB Invest/NMBS*, http://www.raadvst-consetat.be/Arrest-en/84000/700/84721.pdf; Belgian State Council 2 February 1993 no. 41.878, *Seaport Terminals n.v./Stad Antwerpen*, *TBP* 1993, 349; Belgian State Council 31 May 1979 no. 19.671, *s.v. Integan/gemeente Berchem en Bestendige Deputatie Provincie Antwerpen*, *RW* 1979–80, 1040.

[116] M. M. Roggenkamp *et al.*, *Energy Law in Europe: national, EU, and International Regulation* (Oxford: Oxford University Press, 2007) 699, no. 9.176.

[117] J. Van de Voorde, N. Carette, B. Hubeau and P. Van Den Broeck, "De milieu-erfdienstbaarheid of milieugrondlast: een nuttig zakenrechtelijk instrument voor de milieubescherming?", *TPR* 2018, (1195) 1250, no. 80.

[118] S. Demeyere, "Affirmative Land Burdens in German, Dutch and Belgian Law: Possibilities, Restrictions and Workarounds", *EPLJ* 2017, (196) 216, no. 31.

[119] J. Van de Voorde, N. Carette, B. Hubeau and P. Van Den Broeck, "De milieu-erfdienstbaarheid of milieugrondlast: een nuttig zakenrechtelijk instrument voor de milieubescherming?", *TPR* 2018, (1195) 1252, no. 84.

[120] In contrast to the (Belgian) real servitudes, as abovementioned.

[121] https://www.designingbuildings.co.uk/wiki/Wayleave (consulted 9 April 2019).

[122] A. Gibbons *et al.*, *Heat Network Detailed Project Development Resource: Guidance on Strategic and Commercial Case* (London: BEIS, 2016) 156.

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preferable, because it would cater for diversity and future innovation and changes in the heat networks market. As the European Parliament indicates: "a regulatory framework that promotes innovation, without creating unnecessary administrative burdens, in order to best promote cost-effective and environmentally sustainable heating and cooling solutions".[124]

The current issues with heating projects justify the development of a cohesive statutory framework concerning district heating networks. However, where the technical standards need to be codified clearly and made mandatory for the construction and operation of all new heat networks, the mandatory legal standards need to be limited to what is strictly necessary. Since each heating project is unique and specific, it is advisable to limit the regulatory framework to a minimum and to determine the further elaboration contractually, project by project. A regulatory regime for heat networks that sets out a broad framework of principles within which the parties involved have to operate, is recommended. A principle-based form of regulation is the most appropriate policy to address issues on the complex and evolving crossroads of energy law, property law and contract law.

[123] National Research Council, *District Heating and Cooling in the United States: Prospects and Issues* (Washington DC: National Academy Press, 1985) 67.